



## Fact Sheet:

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### COATINGS TO REPEL ZEBRA MUSSELS

#### The Problem

The zebra mussel is not native to U.S. waters, but is believed to have been introduced into this country by a European freighter in 1986. Since then, this organism has progressively infested waters from the Hudson Bay to the Great Lakes, west of the Mississippi River, and as far south as the Gulf of Mexico. Zebra mussels adhere to surfaces coming into contact with infested waters, which causes severe fouling. These mussels are especially devastating to civil works and industrial structures as they colonize on exposed surfaces. Zebra mussels can adhere to almost any material, including themselves, which accounts for the three-dimensional growth of their colonies.

Today the damage from zebra mussel fouling is estimated to be \$5 billion by the year 2000, but without mitigation, the problem will continue to escalate. Among the operations affected are navigation systems (including locks and dams operated by the Corps of Engineers), water treatment plants, and industrial plants such as steelworks, oil companies, food processing, chemical, and mining. Some of the problems include capacity reduction, head loss, damaged piping, increased pumping cost, and changes in water taste and odor. An even more serious problem is blockage of fire protection systems. Methods of mitigating the zebra mussel are needed immediately. However, these methods can pose complex problems. First, the organism exists in a biosphere most likely affected

by any radical measures such as chemical or biocide treatment; second, the numbers of structures already fouled would involve a prohibitive cost for retrofitting or replacing.

### **The Technology**

The U.S. Army Construction Engineering Research Laboratories (CERL) is evaluating different coating systems that could repel zebra mussels and prevent fouling. This work is in cooperation with the U.S. Army Waterways Experiment Station, which is the lead Army laboratory for zebra mussel research. These coatings are being evaluated for potential in either being toxic to the mussel or providing a low-tension, nonadherent surface. They include antifouling systems such as those containing copper or zinc products which are toxic; nontoxic release coatings such as silicone-based systems; and thermal sprayed metallic coatings. Alternative metallic construction materials also are being considered.

### **Benefits/Savings**

Any technology that can alleviate zebra mussel infestation holds the potential to save millions of dollars. The savings will come not only in less damage to structures, but also in reduced downtime for industries impacted by this problem.

### **Status**

CERL is conducting laboratory and field tests of coatings and materials to determine their environmental impact and efficacy. The laboratory work consists of a leachate analysis to determine the release rates for the toxic constituents, copper and zinc. This information is important in understanding the amount of toxin needed to repel the mussels as well as the potential impact on nontarget organisms. Painted and material test panels are exposed at an infested Corps facility. Data gathered at this site can be used to determine the effectiveness of each paint and material. A comparison of the field and lab data is useful in determining the effective leach rates for zinc and copper. The most promising and widely applicable technologies evaluated to date include nontoxic foul-release coatings based on silicone elastomers and thermal sprayed zinc coatings

### **Point of Contact**

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